

PROCEEDINGS
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SUGGESTIONS FOR THE NOMENCLATURE OF THE
CRANIAL LENGTH MEASUREMENTS AND OF
THE CHEEK-TEETH OF MAMMALS.

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Although various reasons prevent the general success of such a wholesale revolution in scientific terms as is described in Wilder and Gage's *Anatomical Technology* (1882), where the many arguments in favor of accurate nomenclature are admirably put forth, yet in various corners of science improvements can be suggested which, if the workers are willing and in touch with each other, may be a real help in reducing the inconvenience of the loose or clumsy terminology commonly in vogue.

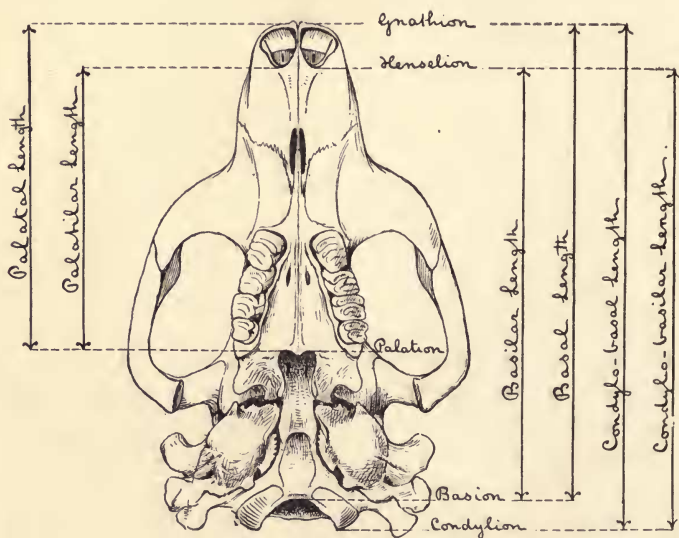
Two such suggestions, due largely to the instigation of Mr. Gerrit S. Miller, Jr., form the subject of the present paper.

I. LENGTH MEASUREMENTS OF THE SKULL AND PALATE.

In giving the length measurement of the skull, not only do different authors at present use different measurements in describing the skulls of similar or related animals, but in doing so they designate these measurements by terms of which it is often difficult or impossible to make out the exact meaning. Such a name as "basal length" has I believe been used by one person or another for almost every one of the measurements to be here-

after defined, and readers are expected to know by heart everything that the user has ever written on the subject, footnotes and all, in order to understand what is meant by the particular term employed. Such a state of things has many inconveniences, and it is hoped the present communication, if it meets with the approval of other workers on the subject, may do a little toward putting an end to the existing confusion.

As long ago as 1894,* by agreeing with Dr. Nehring for the definition of the terms basal and basilar in our own future writ-



ings, I made a first step in this direction, and the present is an amplification of the principle then adopted.

All the difficulty has arisen from the fact that both at the anterior and the posterior ends of the skull there are two measurement points, so that there are four different ways in which the basal length of the skull may be taken, and under that name some authors have adopted nearly every one of them.

It is clear that if a definite name be given to each one of the four measurements, authors, by using these names, will be enabled to give the measurements they fancy without causing confusion in the minds of their readers as to their exact meaning.

*Ann. & Mag. Nat. Hist., Ser. 6, XIII, p. 203.

The different points are:

Anteriorly: 1. THE GNATHION, the most anterior point of the premaxillæ, on or near the middle line.

2. THE HENSELION, the back of the alveolus of either of the median incisors, the point used and defined by Prof. Hensel in his cranio-logical work.

Posteriorly: 3. THE BASION, a point in the middle line of the hinder edge of the basioccipital margin of the foramen magnum.

4. THE CONDYLION, the most posterior point of the articular surface of either condyle.

A fifth measuring point to be referred to below is the PALATION, the most anterior point of the hinder edge of the bony palate, whether in the middle line or on either side of a median spine.

Now using these words for the purposes of definition, I would propose, as shown in the diagram, the following names for the four measurements that may be taken between the points above defined:—

1. BASAL LENGTH, the distance from Basion to Gnathion.
2. BASILAR LENGTH, the distance from Basion to Henselion.
3. CONDYLO-BASAL LENGTH, the distance from Condylion to Gnathion.
4. CONDYLO-BASILAR LENGTH, the distance from Condylion to Henselion.

In addition there may be:

5. GREATEST LENGTH, to be taken not further divergent from the middle line than either condylion. A long diagonal to a projecting bulla or paroccipital process would thus be barred. If however the words "between uprights" be added the measurement would be between two vertical planes pressed respectively against the anterior and posterior ends of the skull at right angles to its middle line.
6. UPPER LENGTH, from tip of nasals to hinder edge of occipital ridge in middle line.

The difference between the words basal and basilar, which at first seemed trivial and indistinctive, is founded on the use of

the English word basal by the older writers, such as Flower and others, who used the measurement from the gnathion; while basilar is an adaptation of the German of Hensel and his school, who used the "*basilar-länge*" from the henselion. These names again, combined with condylo-, readily express the points which are used by those who like to adopt the condylion as a posterior measuring point.

But further, the association of the ending "al" with a measurement from the gnathion, and "ilar" with one from the henselion, if once defined and fixed, may be utilized in a second case of similar character.

The length of the bony palate is a measurement given by all careful describers, but the anterior measuring point used is again either the gnathion or henselion, doubt as to which is being used often nullifying the value of the measurement altogether.* To avoid this doubt I would suggest, exactly as in the other case, that the name of the measurement from the gnathion should end in "al" and that from the henselion in "ilar." We should then have:

PALATAL LENGTH, the distance from gnathion to palation.

PALATILAR LENGTH, the distance from henselion to palation.

The indeterminate "palate length" would then be dropped altogether.

II. THE NAMES OF THE CHEEK-TEETH OF MAMMALS.

Although the cheek-teeth of mammals, the molars and premolars, have been studied and written about ever since the birth of zoology, no uniform system of naming them has been evolved and there is the greatest divergence between the usage of different workers on the subject. In old days all were called molars or grinders; then the premolars were distinguished from the true molars (although French zoologists, Winge in Denmark, and Ameghino in Argentina, continued to use a continuous notation for the two sets of teeth combined) and the usual habit among zoologists in general was to speak of them individually as "second premolar," "third molar," and so on. Even here, however, an important difference cropped up owing to Hensel

* I may explain that in my own descriptions the palate of any given animal has always been measured from the same anterior point, gnathion or henselion, as the skull itself, this latter being indicated by the use of the words basal or basilar.

and his school in Germany numbering the premolars from behind forwards, while naturalists of other nations counted from before backwards, as with the incisors and molars, a difference often productive of fatal confusion.

Of late years, however, partly owing to an increasing consensus of opinion that the seven cheek-teeth of Placentals, four premolars and three molars, are serially and individually homologous with the seven of Marsupials, formerly reckoned as three premolars and four molars, many naturalists have again begun to think that a continuous numeration might be the best one.

But the difficulties in the way of its adoption are very great, largely owing to the absence of any convenient and suitable word in English less clumsy than "cheek-tooth," to express a tooth of the combined premolar and molar series. To speak of the "first cheek-tooth" or of the "predecessor to the fourth cheek-tooth" would be so retrogressive a step that I am sure no one would adopt it. But if instead of trying to find a word for the series combined with a numeral to show the position, we were to have a name for each tooth, we should get something of the immense convenience we have all realized in having definite names for the canine and the carnassial teeth, the latter name being found of value in spite of the fact that the upper and lower carnassials are not homologous with each other. Such names might be made from the positions of the teeth if their meanings were not so obtrusive as to confuse the minds of persons who do not readily understand how a tooth should be called "the second" or "secundus" when it is actually the most anterior of the series.

Now it fortunately happens that while the Latin terms "primus," "secundus," etc., express the serial positions too clearly for the convenience of weak minds, Latinized Greek terms have just about the right amount of unfamiliarity which would enable them to be used as names without their serial origin being too much insisted on. Moreover, their construction is similar to the process we all use in making generic names, and so far as I know they have never been previously utilized in zoology.

Then, after Latinizing the Greek ordinal terms *πρωτος*, etc. for the cheek-teeth of the upper jaw, the same modification as is already used in cusp nomenclature might be adopted for those of the mandible.

We should thus have, counting from before backwards:

		UPPER JAW.	LOWER JAW.
Cheek-tooth	1	Protus	Protid
"	2	Deuterus	Deuterid
"	3	Tritus	Tritid
"	4	Tetartus	Tetartid
"	5	Pemptus	Pemptid
"	6	Hectus	Hectid
"	7	Hebdomus	Hebdomid

To avoid any doubt, I would expressly allocate these names to the permanent teeth of placentals, leaving the names of the marsupial teeth to be settled in accordance with their placental homologies.

For the milk teeth a further modification would be available by prefixing the syllable Pro- to the names of the respective permanent teeth. We could thus for example in the case of a third lower milk premolar call it the protritid, and so use one word instead of four.

Of course I have no supposition that this system would ever be frequently or generally used, but I am convinced that in many special cases, and particularly in such descriptions and catalogues of isolated teeth as paleontologists often have to give, it might result in considerable convenience and saving of space.